

**TITLE: Co-simulation of system model within its operational context**

**Duration and period**

6 Months

**Two words about Samares Engineering**

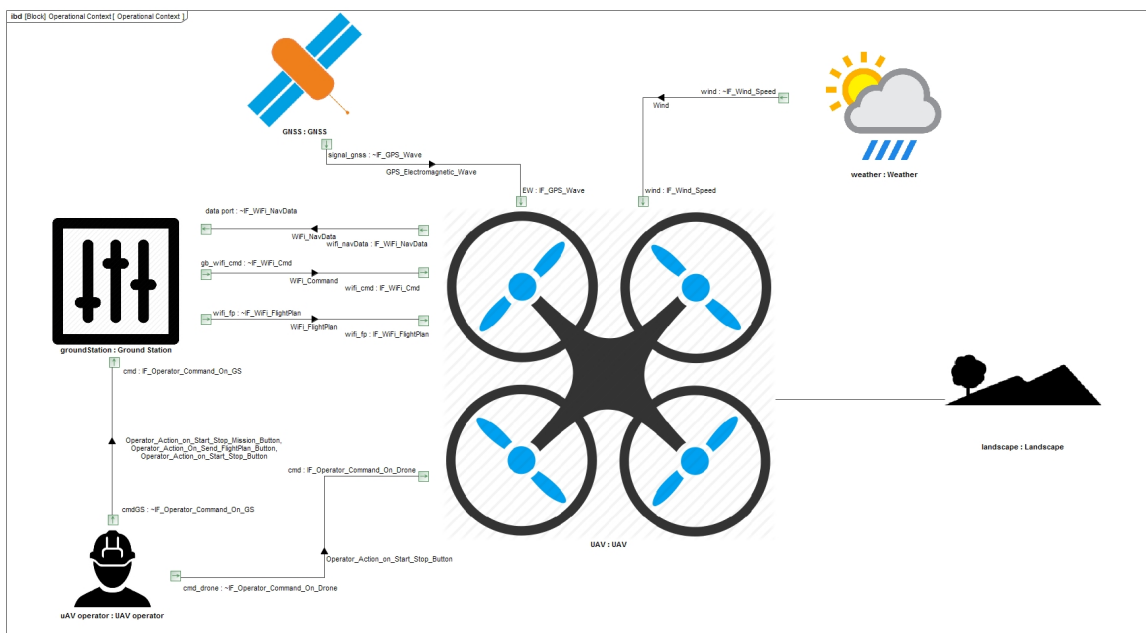
Samares-Engineering is recognized expert in field of systems engineering and more specially in Model-Based Systems Engineering (MBSE). Samares-Engineering provides consultancy for design offices of large companies in different domains: Airbus, Zodiac Aerospace, Comac (China), Schneider Electric, Continental Automotive, Rockwell Collins...

Samares Engineering also does research and provides training courses. It has strong relationships with high schools and research institutes in Toulouse: ISAE Supaero, Enseeiht, Cnam, IRT St Exupery...

**Internship context**

Samares-Engineering is currently developing a MBSE methodology that enables system engineers to simulate a model of their System-of-Interest at each step of the development process, from context to architecture, design up to production.

Currently the representation of operational context of the system is limited to the description of interactions and messages exchanged as illustrated below on a UAV for agriculture.



This kind of model can be animated to show messages exchanged between UAV and its environment, but it remains difficult for end user or customer to clearly understand what really happens in practice and thus to validate modelled behaviour. It would be useful to provide engineers the capability to use 3D model libraries and 3D framework to build and animate the operational context. It could lead to innovative immersive approach where engineers could review and validate operational scenarios in a “digital context” at any moment of the modelling process.

**Goal and tasks**

Goal: main goal is to analyse a set of 3D frameworks and model libraries to enable the integration of a precise system’s environment at the operational context level in order to animate operational scenarios defined in SysML with Sequence Diagrams.

### Tasks

1. Understanding of the State-of-the-Art about 3D frameworks: commercial and open source solutions including ProSivic, cosimate, Morse...
2. Understanding of the current methodology developed by Samares Engineering to describe operational context and operational scenarios. Illustration with models of the UAV for agriculture.
3. Specification and proposal of architecture for a solution that allows co-simulation of those operational scenarios into a 3D animation of the context. You will have strong assistance of our experts in co-simulation and access to 3D animation framework specialists.
4. Design and development of a first prototype of the solution.
5. Promotion of those transformations: you will build demonstration and videos showing how the co-simulation works. You will be supported by whole team of Samares and by Ethics Group partners for multimedia and lab access. We will promote your work through publication and you will present it jointly with R&D engineer from Samares.
6. Report – synthesis and suggestions of improvements

Note: for us, internship is considered as a first step toward job application. In case there are good relationships and good results, Samares Engineering is likely to propose a job and you will have opportunity to continue and extend your work as technical leader of the Samares Engineering methodology or become co-simulation consultant.

### **Pedagogical goals**

Intern will develop skills/knowledge in systems engineering and more especially in model-based system engineering with focus on modelling techniques, simulation and co-simulation, especially with FMI.

### **Working environment**

Samares Engineering is part of Ethics Biotope, an eco-system with different companies and partners involved in building a new vision called “good company”. Collaboration is encouraged and there are many facilities to support companies in their development. It is located in Ethics village at 6 mn from Airport.

Concerning technical environment, you will access to powerful computers and to Samares Lab’ . You will also access multimedia studio to build professional videos with support of specialists (Ethics partners).

### **Intern expected profile**

We are looking for interns with first engineering background and especially in Software Engineering to be able to develop a prototype, and curious about learning new methods and tools.

### **Location**

BLAGNAC- 2, Avenue de l’Escadrille Normandie Niemen, Ethics Biotope.

### **Internship compensation**

900 € / month

### **Application for this offer**

You can apply directly from our web site: <http://www.samares-engineering.com/fr/contact-2/#a99b4ba4b2c1195c3>

You can also apply to this offer by email to: [contact@samares-engineering.com](mailto:contact@samares-engineering.com)